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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/273,691	03/22/1999	TINGHUI HUANG	64.600-039	7443

7590

07/24/2002

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EXAMINER

QI, ZHI QIANG

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 07/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/273,691

Applicant(s)

HUANG, TINGHUI

Examiner

Mike Qi

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-18 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-18 and 20-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2871

DETAILED ACTION

The Final Office Action mailed on Jan.15, 2002 is hereby vacated and prosecution is reopened.

Claim Rejections - 35 U.S.C. § 103

1. The following is a quotation of 35 U.S.C. 103 (a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-18, 20-22 are rejected under 35 U.S.C. 103 (a) as being unpatentable over US 6,100,948 (Kim et al) in view of US 5,696,566 (Kim et al) and US 5,600,460 (Yamamoto et al).

Claims 1, 10 and 20, Kim's 948, discloses (col. 4, lines 1-68, and in Fig.5) that a front-side repairable TFT-LCD assembly composing:

- a TFT-LCD equipped with wirings such as gate lines (G_1, G_2, G_3, \dots) and data lines (D_1, D_2, D_3, \dots), i.e., a first multiplicity of buslines;
- using repair lines (RL) intersects the gate lines and the data lines with an insulating layer therebetween and the repair lines (RL) formed around a display region, i.e., the repair lines positioned outside and in parallel with a circuitry on the TFT-LCD.

Art Unit: 2871

Kim's 948 does not expressly disclose that coating a black matrix film on a glass cover plate and patterning the black matrix film having apertures corresponding to the repair lines, and allowing a laser beam to pass therethrough for welding a repair line to a busline.

However, Kim's 566 discloses (col.3, lines 14-30; Figs. 2 and 6) that the black matrix (20) for light shielding is formed on the inner surface of front glass substrate (101), and the black matrix (20) is formed by appropriately patterning a light-shielding layer, using a conventional photolithography process, to define the aperture area. Kim's 566 also discloses (col.6, lines 3-6; col.7, lines 7-19; col.8, lines 14-31 and Fig.9) that any short circuits or fractures of the digital signal lines and the scanning lines in such construction are repaired by a laser beam. Kim's 566 also indicates (in Abstract) that in such structure the disconnections and the shorts in the crossing portion of wiring is minimized, while maintaining high aperture and contrast ratios.

Although the apertures in the black matrix is used for improving the contrast ratio, but the aperture also can be used for repair. Yamamoto discloses (col.21, lines 57 - 60; Fig.29) that the laser beam (6) uses the aperture to perform the repair. Inherently, the repair line must be corresponding to the laser beam and the aperture, so that the laser beam is allowed to pass the aperture for welding a repair line to a busline.

Concerning claims 10 and 20, using the glass substrate as a cover plate as disclosed in Kim's 566 (Fig.2, glass substrate 101) for mounting the assembly would have been at least obvious.

Art Unit: 2871

Concerning claim 20, Kim's 566 discloses (col. 7, lines 7-19; Fig.9) that using laser beam to cut the short circuit between the scanning signal line (1) and the display signal line (5a) occurring at the wiring crossing portion, so that the laser beam must pass through the aperture.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use repair lines and black matrix film having apertures to allow a laser beam to pass therethrough, and welding a repair line to a busline by fusing as claimed in claims 1, 10 and 20 for minimizing the disconnections and shorts and maintaining high contrast display.

Claims 2-3, 15-16, concerning the repair lines spaced-apart is three or five, Kim's 566 discloses (col.1, lines 49-53) a large screen display to obtain a high definition image needs to increase the number of pixels. When the number of pixels increased, the aperture ratio would be decreased, so that the brightness would be decreased. The repair lines are corresponding to the apertures. So that to arrange the spaced-apart between the repair lines would affect the aperture ratio.

Therefore, to select a proper spaced-apart between repair lines to attain an optimum results for the definition and the brightness of the image that would have been at least obvious.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to select the three or five spaced-apart and parallel repair lines intersect the buslines as claimed in claims 2-3 and 15-16 for achieving an optimum display having high definition and high brightness.

Art Unit: 2871

Claims 4 and 17, the first multiplicity of buslines comprises gate buslines and data buslines that was an obvious designation for the gate buslines and the data buslines.

Claims 5, 8, 11-12, see the explanation of Kim's 566 above. Patterning the black matrix film by a photolithographic method and forming the apertures in the black matrix film by an etching method was conventional.

Claims 7, 9, 13-14, 18, 21-22 see the explanation of Kim's 566 above. Using the irradiation of a laser energy beam through the apertures either for welding the connections or for severing to cut the shorted circuits using the laser's heating as claimed in claims 7, 13, 18, 21-22; and first must find the defective location, and then to effecting the repair, as claimed in claims 9, 14 would have been at least obvious.

Response to Arguments

3. Applicant's arguments filed on June 4, 2002 have been fully considered but they are not persuasive.

Applicant's **only** arguments are as follows:

(1) The aperture disclosed by the reference is for LCD cell for display of image and not for repair.

(2) The present invention structure, as shown in Figs. 3 and 4, clearly does not contain a liquid crystal layer between the two glass plates, and at least one repair line positioned outside of and in parallel with a circuitry on the TFT-LCD.

Art Unit: 2871

(3) The references have nothing to do with repair as taught by the present invention.

Examiner's responses to Applicant's **only** arguments are as follows:

(1) Kim's 566 discloses (col.3, lines 14-30; Figs. 2 and 6) that the black matrix (20) for light shielding is formed on the inner surface of front glass substrate (101), and the black matrix (20) is formed by appropriately patterning a light-shielding layer, using a conventional photolithography process, to define the aperture area. Kim's 566 also discloses (col.6, lines 3-6; col.7, lines 7-19; col.8, lines 14-31 and Fig.9) that any short circuits or fractures of the digital signal lines and the scanning lines in such construction are repaired by a laser beam. Kim's 566 also indicates (in Abstract) that in such structure the disconnections and the shorts in the crossing portion of wiring is minimized, while maintaining high aperture and contrast ratios.

Although the apertures in the black matrix is used for improving the contrast ratio, but the aperture also can be used for repair. Yamamoto discloses (col.21, lines 57 - 60; Fig.29) that the laser beam (6) uses the aperture to perform the repair. Inherently, the repair line must be corresponding to the laser beam and the aperture, so that the laser beam is allowed to pass the aperture for welding a repair line to a busline

(2) Before injecting the liquid crystal material into the space between the two glass plates, the device would do not contain a liquid crystal layer between the two glass plates, and Kim's 948 discloses (col. 4, lines 1-68, and in Fig.5) that a front-side repairable TFT-LCD assembly using repair lines (RL) intersects the gate lines and the data lines with an insulating layer

Art Unit: 2871


therebetween and the repair lines (RL) formed around a display region, i.e., the repair lines positioned outside and in parallel with a circuitry on the TFT-LCD.

(3) Kim's 566 discloses (col.6, lines 3-6; col.7, lines 7-19; col.8, lines 14-31 and Fig.9) that any short circuits or fractures of the digital signal lines and the scanning lines in such construction are repaired by a laser beam. Kim's 566 also indicates (in Abstract) that in such structure the disconnections and the shorts in the crossing portion of wiring is minimized, while maintaining high aperture and contrast ratios..

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
July 17, 2002


William L. Sikes
Supervisory Patent Examiner
Technology Center 2800